

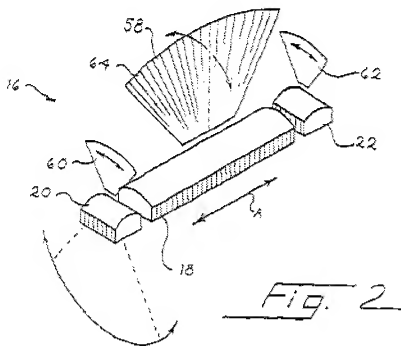
DETAILED ACTION

Response to Arguments

Applicant's arguments, see remarks, filed 01/03/10, with respect to the rejection(s) of claim(s) 1 and 45 under sections 102(e)/103(a) have been fully considered. However, upon further consideration, a new ground(s) of rejection is made in view of newly found prior art.

Additionally, patentability for the claims is yet opposed since the prior art in terms of Rafter et al and Dreschel et al is yet evidencing that artisans entertained MUT array elements as interchangeable with single crystal-derived piezoelectric array elements and subject to the same conventional lens and backing layering and associated electronics.

Moreover, the new prior art of Hossack et al.(US6,360,027) clearly discloses the use of a curved acoustic lens mounted over the ultrasonic transducer array front face in both the azimuth and elevation directions as illustrated in fig. 2 below of the Hossack et al. specifications (see col. 5, line 60 – col. 6 line 32).



Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-2, 8, 16, 42 and 45 are rejected under 35 U.S.C. 102(e) as anticipated by Rafter et al (US6425869), or in the alternative under 35 USC 103(a)

as obvious based upon Rafter et al in view of Dreschel et al (US6605043), or Hossack et al.(US6,360,027).

The former teaches a cMUT embodiment associated with Fig. 6 and col. 13 - 14 top lines where the curved partially cylindrical lens 210 depicted in Fig. 2 in association with the single piezocrystal multi-element diced design may be assumed to be also used with the MUT variant which is stated to be interchangeable therewith. In the alternative, Dreschel et al similarly teaches that a lens may be attached to a cMUT array per col. 9 - 10 discussion considered together with col. 8 lines 62 - 65, albeit that the lens is not explicitly stated to be curved.

Also the Hossack et al. patent teaches an acoustic lens mounted over the array front face (see fig. 2). The lens is preferably curved in both the azimuth and elevation directions (col. 5, line 60 – col. 6 line 32). It would have been obvious in view of the latter to do so since this would allow the subarrays to be independently focusable.

Claims 3- 4, 9 and 46 are rejected under 35 U.S.C. 103(a) based on the references as applied to claim 1 above, and further in view of Ishrak et al (US5667491) which evidences via element 502 of Figs. 5A-5B that a lens as in the former would be held on to the array by adhesive so it doesn't fall off. Such an epoxy layer would be a chemical barrier to diffusion in relation to the direct contact state such as by clamping the lens perimeter.

Claims 6-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rafter et al alone or further in view of Dreschel et al, or Hossack et al references

as applied to claim 1 above, and further in view of Fraser (US6328696) insofar as whereas the former are silent as to grouping of cMUTs together, it would have been obvious in view of the latter col. 3 lines 37 - 38 to do so since as manufactured they are of small size however they may be operated as larger functional units.

Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 2 above, and further in view of Hanafy (US6258034, of record) as applied for its lens detail teaching per page 3 paragraph first of the prior Office action on the merits.

Claims 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied above, in either case further in view of Ishrak et al as applied to claim 9 above, and further in view of Eaton et al (US5876345) as the latter was applied for its silicate/adhesion teachings per arguments page 4 of the prior 1/2006 Office action.

Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable the references as applied above, in either case Ishrak et al as applied to claim 9 above, and further in view of Snow (US6749554, of record) as the latter was applied on page 4 of the said prior action.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 1 above, and further in view of Robinson (US6659954) since the latter taught col. 2 lines 1 - 10 to use pMUT arrays as an equivalent for ultrasound array fabrication.

Claim 18 is also rejected under 35 U.S.C. 103(a) as being unpatentable over Hossack et al reference as applied to claim 1 above, and further in view of Barnes et al insofar as whereas the former indicates generally that the cMUT array may be patterned with its switches onto silicon, the latter extends this per col. 4 lines 54-67 and col. 8 line 66 - col. 9 line 37 to CMOS fabrication within the silicon wafer.

Claims 39-40 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as applied to claim 1 above, in either case further in view of Fraser as discussed in relation to the claim 6 above, further in view of Chiao et al (US5882309) or Mason et al (US5931785) insofar as the latter respectively enhance the former interconnection teachings re 1.5D configuration by noting respectively col. 3 lines 15 - 38 and col. 7 lines 41 - 59 that transducers are hardwired or permanently connected in elevational pairs because the delay operation is symmetric in that case. Otherwise Barnes et al teaches the CMOS switch embedding within the silicon substrate.

Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Rafter et al alone or further in view of Dreschel et al, in either case further in view of Fraser further in view of Chiao et al or Mason et al as applied to claim 39 above, and further in view of Robinson, for reasons paralleling the argument against claim 17.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **JOHN F. RAMIREZ** whose telephone number is (571)272-8685. The examiner can normally be reached on (Mon-Fri) 7:00 - 3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian L. Casler can be reached on (571) 272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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